

SN 09/298,297  
Docket No. S-91,732  
In Response to Office Action dated December 6, 2004

#### AMENDMENTS TO THE SPECIFICATION:

Please replace the Abstract with the following amended paragraph:

~~Photoinduced charge transfer materials for nonlinear optical applications. A~~  
method using polyelectrolyte self-assembly for preparing multi-layered organic  
molecular materials having individual layers which exhibit ultrafast electron and/or  
energy transfer in a controlled direction occurring over the entire structure is described.  
~~The construction of thin films utilizing these materials leads to enhanced nonlinear~~  
~~optical effects such as photoinduced changes in the refractive index. Using a high~~  
molecular weight, water-soluble, anionic form of poly-phenylene vinylene, self-  
assembled films can be formed which show high photoluminescence quantum  
efficiency (QE). The highest emission QE is achieved using poly(propylene-imine)  
(PPIV) dendrimers as cationic binders. Self-quenching of the luminescence is observed  
as the solid polymer film thickness is increased. This self-quenching and can be  
reversed by inserting additional spacer layers of transparent polyelectrolytes between  
each active conjugated layer, such that the QE grows with thickness. A red shift of the  
luminescence (up to 75 nm) is also observed as additional PPV layers are added. This  
effect persists as the self-quenching is eliminated, ~~implying a longer range effect, and~~  
~~the effect along with the increase in QE are both attributed to a change in the~~  
~~conformation of the polymer chains as the superstructure is assembled, together with~~  
~~efficient Förster energy transfer in a preferred direction away from the substrate toward~~  
~~layers with longer effective conjugation length. In addition to this unidirectional energy~~  
~~transfer, charge~~Charge transfer superlattices can be formed by additionally  
incorporating C<sub>60</sub> acceptor layers. ~~Although the fullerene layer induces only a minor~~  
~~change in the absorbance of the film, the emission from the conjugated polymer layers~~  
~~is nearly completely quenched. This indicates photoinduced charge transfer to the~~  
~~fullerene top layer with high efficiency and preferred direction. Hence the required~~  
~~molecular level control over photo-induced charge and energy transfer, together with~~  
~~ordered molecular orientation have been demonstrated.~~